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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/939,716

08/28/2001

Kazushige Yonenaga

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EXAMINER

LEUNG, WAI LUN

ART UNIT

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2613

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DELIVERY MODE

10/28/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/939,716	Applicant(s) YONENAGA ET AL.	
	Examiner DANNY W. LEUNG	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16, 17 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 is/are allowed.
- 6) ☒ Claim(s) 16 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Objection to Specification Amendment

2. The amendment filed 10/14/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

“Preferably, the loss in a traveling wave type electrode at $f_0/2$ is always smaller than the loss at frequency higher than $f_0/2$, and modulation efficiency of said Mach Zehnder light intensity modulator at $f_0/2$ is larger than that at frequency higher than $f_0/2$, where f_0 is clock frequency of an electrical binary signal.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 16, specification as originally file, does not disclose “wherein loss in said traveling wave type electrode at $f_0/2$ is always smaller than loss at frequency higher than $f_0/2$, where f_0 is clock frequency of said electrical binary signal”.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Furthermore, the key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.* note that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn* 441 F.3d977,988,78 USPQ2d1329,1336(Fed.Cir.2006) stated that “[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”

6. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Yonenaga et al.** (*US005543952A*), in view of **Chung et al.** (*XP000227527*) ““Modeling and Optimization of Traveling-Wave LiNbO₃ Interferometric Modulators”, *IEEE Journal of Quantum Electronics*, Vol 27, No 3, March 1991.

Regarding claim 24, **Yonenaga** discloses an optical transmitter (*fig 1b*) comprising:
an input terminal for accepting an electrical binary signal (*col 3, ln 34-35*),
an electrical-optical conversion means for converting an electrical signal to an optical signal (*col 3, ln 37-45*),
said electrical-optical conversion means having a traveling wave type electrode operating to restrict bandwidth of an output light of said electrical-optical conversion means (*col 8, ln 4-9*), wherein said electrical-optical conversion means is a Mach Zehnder light intensity modulator having a traveling wave type electrode (*col 8, ln 21-39*),
a precoding means (*fig 1B, 80*) provides an output which is the same as the previous output when an input binary digital serial is 0, and an output which differs from the previous output when an input digital signal is 1 (*fig 10, Data signal as input, precoded signal is the output*), and
said traveling wave type electrode (*fig 1B, 70*) is designed so that phase change of optical wave propagating in said optical waveguide depending upon said electrical field has waveforms of a ternary duobinary signal (*fig 12F*).

Yonenaga does not disclose expressly the bandwidth restriction procedures of said Mach Zehnder light intensity modulator in detail. **Chung**, from the same field of endeavor, teaches a Mach Zehnder Light intensity modulator, being operated as an electrical-optical conversion means (*col 1, page 608*), having a traveling wave type electrode (*page 612, section III*), bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted because of loss of said traveling wave type electrode (*page 613, sections A describes relationships between loss of traveling wave type electrode and its bandwidth; section B describes its*

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parameters being used to drive the modulator) and by using mismatching of phase velocity of electric wave propagating on said traveling wave type electrode (*col 2, page 614 discuss the relationship between velocity mismatch, power requirement, and other parameters relative to bandwidth; fig 6 further illustrates such numerical procedures to define bandwidth*) and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by an electric wave (*fig 2 a & b illustrate the variation of refractive index depending on electrical field generated by the electric wave, an inherent property of MZ-modulator*). Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to implement Chung's technique to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode and by using mismatching of phase velocity of electric wave propagating on said traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by said electric wave, onto **Yonenaga**' system as suggested by **Chung**. The motivation for doing so would have been to be able to simplify optimization procedures by determining the set of parameters that will satisfy the given bandwidth requirement to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode (*Chang, page 616, section V*).

Furthermore, it would have been obvious for a person of ordinary skill in the art at the time when the invention was made to recognize the known improvement technique such as that of **Chung**'s could have applied in the same way to **Yonenaga**'s base device and the results of bandwidth limitations would have been predictable to one of ordinary skill in the art. Therefore,

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the rationale of use of known technique (**Chung's**) to improve similar methods (**Yonenaga's**) in the same way has been clearly articulated herein with the *Graham* inquiries and findings as presented above. *In re Nilssen* 851 F.2d 1401, 7 USPQ 2d 1500 (Fed.Cir.1988) at 1403, 7 USPQ2d at 1502, the court found "it would have been obvious to one of ordinary skill in the art to use the threshold signal produced in the USSR device to actuate a cutoff switch to render the inverter inoperative as taught by Kammiller." That is, using the known technique of a cut off switch for protecting a circuit to provide the protection desired in the inverter circuit of the USSR document would have been obvious to one of ordinary skill.

The combination of Yonenaga and Chung does not disclose expressly an amplifier for amplifying an input signal applied to said input terminal to level requested for operating said electrical-optical conversion means, and applying the amplified electrical signal to said electrical-optical conversion means, and wherein the precoding means is provided at an input stage of said amplifier. However, Examiner takes official notice that it is common and well known to place an amplifier along a transmission medium in order to restore signal strength. As it is well recognized that signal degrade as they travel through a transmission medium, it would have been obvious for a person of ordinary skill in the art at the time when the invention was made to put amplifiers along any points of a transmission system or medium, such as at said input terminal to level requested for operating said electrical-optical conversion means, and/or at the output stage of the precoding means. The motivation for doing so would have been to have enough signal strength to operate the system.

Response to Arguments

7. Applicant's arguments with respect to claims 24 have been considered but are moot in view of the new ground(s) of rejection.

8. Applicant's arguments with respect to claims 16 have been considered but are not persuasive.

Applicant argues that "Examiner has indicated that claims 16 and 17 set forth allowable subject matter", however, claim 16 previously stated "wherein loss in said traveling wave type electrode at $f_0/2$ is always larger than loss at frequency higher than $f_0/2$, where f_0 is clock frequency of said electrical binary signal", on page 4 of amendment filed 4/18/2008. The new amended claim 16 stated "wherein loss in said traveling wave type electrode at $f_0/2$ is always larger than loss at frequency smaller than $f_0/2$, where f_0 is clock frequency of said electrical binary signal" on page 4 of amendment filed 10/14/2008.

Applicant stated that this is due to a typographical error. Examiner disagrees. Since this change is completely opposite to what applicant originally filed, such amendment does not have support from the original disclosure filed 8/28/2001.

Applicant cited a paragraph from the specification on page 21, at lines 21-29,

~~"According to the present invention, the length and/or shape of electrodes are not designed for high speed operation, but designed to satisfy desired bandwidth restriction performance by using loss in an electrode, and phase mismatching between an electrical modulation signal and an optical wave which is subject to be modulated, so that a MZ light modulator doubles as a bandwidth restriction means."~~

However, such recitation has nothing to do with "wherein loss in said traveling wave type electrode at $f_0/2$ is always larger than loss at frequency smaller than $f_0/2$, where f_0 is clock

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frequency of said electrical binary signal”. The cited paragraph mention the length / shape of the electrodes are designed to satisfy desired bandwidth restriction performance, but does not necessarily mean that “electrodes are designed for restricting high frequency, i.e., as lowpass filter”, and “the loss at $f_0/2$ is smaller than frequencies above $f_0/2$ ” is simply not supported or even inferred, or mentioned anywhere throughout prosecution history.

Allowable Subject Matter

9. Claim 17 is allowed as previously indicated.

Conclusion

10. The prior art made of record in previous actions and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANNY W. LEUNG whose telephone number is (571)272-5504. The examiner can normally be reached on 11:30am-9:00pm Mon-Thur.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DANNY W LEUNG
Examiner
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Examiner, Art Unit 2613
10/29/2008

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